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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/920,633	08/03/2001	Osamu Nagano	02887-0208	6947

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EXAMINER

NGUYEN, LAM S

ART UNIT PAPER NUMBER

2853

DATE MAILED: 03/13/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/920,633

Applicant(s)

NAGANO ET AL.

Examiner

LAM S NGUYEN

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-8 and 13 is/are rejected.
- 7) ☒ Claim(s) 9-12 and 14-20 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 03 August 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 6, 4.
- 4) ☐ Interview Summary (PTO-413) Paper No(s) ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

1. Claims 1-8 are rejected under 35 U.S.C. 102(a) as being anticipated by Osamu et al. (JP 2001-093825).

Osamu et al. disclose a charged particle beam exposure system comprising: a charged particle beam emitting device (FIG. 4, element 11) which generates charged particle beams with which a substrate is irradiated (FIG. 4, element 29), said charged particle beam emitting device generating the charged particle beams at an accelerating voltage which is lower than that at which an influence of a proximity effect occurs (Abstract), the proximity effect being a phenomenon in which a secondary charged particle and/or a reflected charged particle which is/are produced from the surface of the substrate irradiated with the charged particle beams influence(s) an exposure extent of a pattern which is adjacent to a pattern to be written;

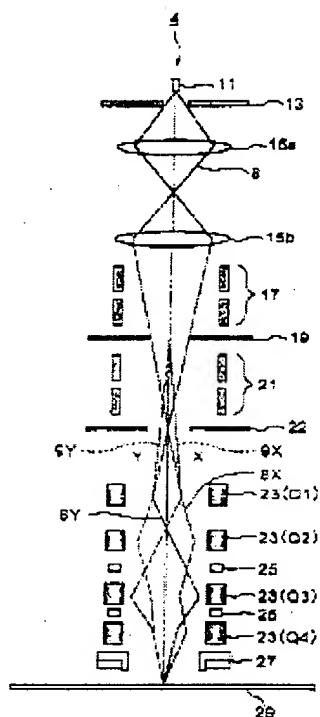
an illumination optical system which adjusts a beam diameter of the charged particle beams so that density of the charged particle beams is uniform (FIG. 15a-b);

a character aperture in which an aperture hole is formed in a shape corresponding to a desired pattern to be written (FIG. 4, element 2);

a first deflector which deflects the charged particle beams by an electrostatic field

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that the charged particle beams have a desired sectional shape and travel towards a desired aperture hole and which returns the charged particle beams passing through said aperture hole to an optical axis thereof (FIG. 4, element 21);



a reducing projecting optical system which forms a multi-pole lens field so that the charged particle beams passing through said character aperture substantially reduce at the same demagnification both in X and Y directions when the optical axis extends in Z directions and form an image on the substrate without forming any crossover between said character aperture and the substrate (FIG. 4, all elements from element 22 to element 29 and paragraph 0054); and

a second deflector which deflects the charged particle beams passing through said

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character aperture by means of an electrostatic field to scan the substrate with the charged particle beams (FIG. 4, elements 25).

Referring to claims 2, 4: wherein said reducing projecting optical system includes multi-pole lenses the number of which is N_1 , N_1 being a natural number of 3 or more (FIG. 4, element 23(Q1-Q4); $N_1 = 4$).

Referring to claim 3: wherein said second deflector deflects the charged particle beams in the X directions and the charged particle beams in said Y directions independently to each other (FIG. 4).

Referring to claim 5: wherein said four multi-pole lenses are controlled to form first through fourth electrostatic fields so that said first through fourth electrostatic fields sequentially form a divergent electrostatic field (FIG. 4, element 23(Q1)), a divergent electrostatic field (FIG. 4, element 23(Q2)), a convergent electrostatic field (FIG. 4, element 23(Q3)), and a divergent electrostatic field (FIG. 4, element 23(Q4)), in one direction of the X and Y directions and so as to sequentially form a convergent electrostatic field, a convergent electrostatic field, a divergent electrostatic field and a convergent electrostatic field in the other direction of the X and Y directions.

Referring to claim 6: wherein said second deflector includes a plurality of electrostatic deflectors (FIG. 4, elements 25).

Referring to claim 7: wherein said second deflector superimposes an electrostatic deflection field on said multi-pole lens field to deflect the charged particle beams (FIG. 3).

Referring to claim 8: which further comprises a first main deflector which includes multi-pole electrodes, said first main deflector being provided between a second multi-pole lens

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and a third multi-pole lens of said first multi-pole lenses (FIG. 4, element 25 between elements 23(Q2) and 23(Q3)), said third multi-pole lens and said fourth multi-pole lens serve as a second main deflector for superimposing an electrostatic deflection field on said multi-pole lens field (FIG. 4, element 25 between elements 23(Q3) and 23(Q4)). and said second deflector includes said first main deflector and said second main deflector, said second deflector deflecting the charged particle beams independently in said X and Y directions by deflecting the charged particle beams in the X directions by a first main deflection field formed by said first main deflector and a second main deflection field formed by said second main deflector and deflecting the charged particle beams in the Y directions by said second main deflection field (FIG. 3-4).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

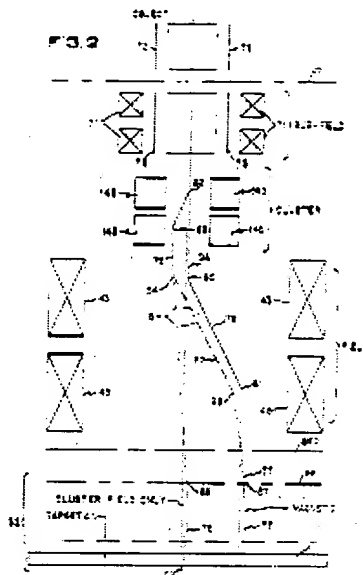
2. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Osamu et al. (JP 2001-093825) in view of Davis et al. (US 4945246).

Osamu et al. disclose the claimed invention as discussed above except wherein the inside diameter of said first multi-pole lens and said second multi-pole lens is a first inside diameter and the inside diameter of said third multi-pole lens and said fourth multi-pole lens is a second inside diameter which is greater than said first inside diameter.

However, Davis et al. disclose an E-beam deflection system wherein the inside diameter of said first multi-pole lens and said second multi-pole lens is a first inside diameter and the

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inside diameter of said third multi-pole lens and said fourth multi-pole lens is a second inside diameter which is greater than said first inside diameter (FIG. 2, elements 71, 43, 45).



Therefore, it would have been obvious for one having ordinary skill in the art at the time the invention was made to arrange the multi-pole lens used in the charged beam exposure device disclosed by Osamu et al. such that the second inside diameter is greater than the one of the first inside diameter as disclosed by Davis et al. The motivation of doing so is to take the advantage of the vail lens by reducing the time required to deflect the beam to various exposure sites on the target plane or water as taught by Davis et al. (column 3, line 37-39).

Allowable Subject Matter

3. Claims 9-12, 14-20 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

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Referring to claim 9: The most pertinent art Osamu et al. (JP 2001-093825) and Davis et al. (US 4945246) fail to disclose wherein said second deflector further includes a sub deflector downstream of said N1-th multi-pole lens. Therefore, the claimed invention is not disclosed by the prior arts.

Referring to claim 14: The most pertinent art Osamu et al. (JP 2001-093825) and Davis et al. (US 4945246) fail to disclose which further comprises a first shielding electrode which is provided in the vicinity of the top and bottom faces of said multi-pole lens in the Z directions. Therefore, the claimed invention is not disclosed by the prior arts.

Referring to claims 10-12, 15-20: Allowable since their dependence on the allowable claims 9, 14.

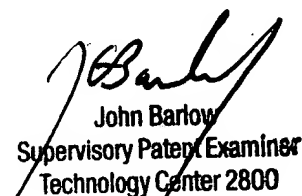
Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to LAM S NGUYEN whose telephone number is (703)305-3342. The examiner can normally be reached on 7:00AM - 3:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, JOHN E BARLOW can be reached on (703)308-3126. The fax phone numbers for the organization where this application or proceeding is assigned are (703)305-3431 for regular communications and (703)305-3432 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)308-0956.

LN
March 7, 2003


John Barlow
Supervisory Patent Examiner
Technology Center 2800